

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (Currently Amended): A semiconductor manufacturing apparatus comprising:

an integrated measuring instrument for measuring the form or size of an element to be formed on a wafer;

an etching unit for etching the wafer by using plasma generated under reduced pressure;

an ashing unit for ashing the etched wafer;

a wetting unit for wetting the etched wafer;

a drying unit for drying the wafer which has gone through a wetting treatment; and

transport means for transporting wafers the wafer to the integrated measuring instrument and each working unit, including the etching unit, the ashing unit, the wetting unit and the drying unit along a depressurizable transport passage; and

control means for controlling an order of treatment of each working unit, including the etching unit, the ashing unit, the wetting unit and the drying unit for transporting, using said transport means, along the depressurizable transport passage;

wherein, depending upon an order of treatment designated by said control means, the etched wafer is ashed and then subjected to the wetting treatment, or the etched wafer is wetted and then subjected to an ashing treatment, and afterwards, the etched wafer is measured by the integrated measuring instrument.

Claim 2 (Previously Presented): The semiconductor manufacturing apparatus according to claim 1, wherein the integrated measuring instrument measures at a position in a wafer alignment mechanism set under normal pressure to measure the form or size of an element to be formed on the wafer.

Claim 3 (Currently Amended): The semiconductor manufacturing apparatus according to claim 1, wherein the integrated measuring instrument is connected to the etching unit, via a depressurized the depressurizable transport passage, and the wafer is measured under reduced pressure.

Claim 4 (Previously Presented): The semiconductor manufacturing apparatus according to claim 1, wherein the integrated measuring instrument is mounted at a position in a load lock chamber under reduced pressure to measure the form or size of an element to be formed on the wafer.

Claim 5 (Previously Presented): The semiconductor manufacturing apparatus according to claim 1, wherein the integrated measuring instrument measures the form or size of an element to be formed on the wafer based on a spectrum of a reflected version of light applied to the wafer.

Claim 6 (Currently Amended): A semiconductor manufacturing apparatus comprising:

an integrated measuring instrument for measuring the form or size of the element to be formed on a wafer;

etching means for etching the wafer by using plasma generated under reduced pressure;

ashing means for ashing the etched wafer;

wetting means for wetting the etched wafer;

drying means for drying the wafer which has gone through a wetting treatment; and

transport means for transporting wafers contained in a wafer cassette one by one successively along a depressurizable transport passage to the integrated measuring instrument for measurement and each working unit, including the etching means, the ashing means, the wetting means and the drying means, for treatment; and

control means for controlling an order of treatment of each working unit, including the etching means, the ashing means, the wetting means and the drying means for transportation, using said transport means, along the depressurizable transport passage;

wherein, depending upon an order of treatment designated by said control means, the etched wafer is ashed and then subjected to the wetting treatment, or the etched wafer is wetted and then subjected to an ashing treatment, and afterwards, the etched wafer is again measured by the integrated measuring instrument .

Claim 7 (Currently Amended): The semiconductor manufacturing apparatus according to claim 6, wherein, after a working process of at least one of the wafers contained in the wafer cassette has been completed, the processed wafer

is measured by the integrated measuring instrument, the etching unitmeans is controlled based on a measured value, and the remaining wafers are processed one by one successively.

Claim 8 (Previously Presented): The semiconductor manufacturing apparatus according to claim 6 or 7, wherein the form or size of the element on the pre-etched wafer transported into the integrated measuring instrument is measured, and the etching means is controlled based on such measurements.

Claim 9 (Previously Presented): The semiconductor manufacturing apparatus according to claim 6 or 7, wherein the form or size of the element on the post-treatment wafer transported into the integrated measuring instrument is measured, and the etching means is controlled based on such measurements.

Claim 10 (Previously Presented): The semiconductor manufacturing apparatus according to claim 6 or 7, wherein the form or size of the element on the pre-etched and post-etched wafer transported into the integrated measuring instrument is measured, and the etching means is controlled based on the difference of such measurements.

Claim 11 (Previously Presented): The semiconductor manufacturing apparatus according to claim 6 or 7, wherein the integrated measuring instrument determines whether to continue or stop the etching based on measurements of the form or size of the element on the wafer.

Claim 12 (Previously Presented): The semiconductor manufacturing apparatus according to claim 1, wherein the integrated measuring instrument estimates the form or size of the element to be formed on the wafer from a spectral distribution of a reflected version of light applied to the wafer.

Claim 13 (Previously Presented): The semiconductor manufacturing apparatus according to claim 1, wherein, after a working process of at least one of the wafers has been completed, the processed wafer is measured by the integrated measuring instrument, and the etching unit is controlled based on measured values, and the remaining wafers are processed one by one successively.

Claim 14 (Previously Presented): The semiconductor manufacturing apparatus according to claim 7, wherein the integrated measuring instrument measures the form or size of an element on the wafer which has completed treatments, and makes optimum control of the etching means based on such measurements.

Claim 15 (Currently Amended): An apparatus for processing a wafer comprising:

an optical measuring instrument arranged to measure a dimension of a structure to be formed on a wafer;

an etching unit arranged to etch the wafer, via a mask pattern, to form a structure on the wafer, using plasma generated under reduced pressure, based on an etching condition;

an ashing unit arranged to remove the mask pattern from the wafer after etching;

a wetting unit arranged to wet the wafer so as to remove undesirable corrosive substance produced by etching, including any protective film deposited on a sidewall of the structure on the wafer;

a drying unit arranged to dry the wafer after wetting; and

a transport mechanism for transporting individual wafer from a batch placed in a wafer cassette through the optical measuring instrument, the etching unit, the wetting unit and the drying unit along a depressurizable transport passage; and
control means for controlling an order of treatment of each working unit,
including the etching unit, the ashing unit, the wetting unit and the drying unit for
transportation, using said transport mechanism, along the depressurizable transport
passage:

wherein, depending upon an order of treatment designated by said control means, the wafer after etching is ashed, via the ashing unit, and then subjected to wetting, via the wetting unit, or, alternatively, the wafer after etching is wetted, via the wetting unit, and then subjected to ashing, via the ashing unit, and afterwards, the structure on the wafer is again measured at the optical measuring instrument for any abnormality such that the etching condition can be optimized for measurement of a next wafer in the batch placed in the wafer cassette.

Claim 16 (Previously Presented): The apparatus according to claim 15, wherein the optical measuring instrument measures is mounted at a position in a wafer alignment mechanism set under normal pressure to measure the form or size of a structure to be formed on the wafer.

Claim 17 (Currently Amended): The apparatus according to claim 15, wherein the optical measuring instrument is connected to the etching unit, via a depressurized the depressurizable transport passage, and the wafer is measured by the optical measuring instrument under reduced pressure.

Claim 18 (Previously Presented): The apparatus according to claim 15, wherein the optical measuring instrument is mounted at a position in a load lock chamber under reduced pressure to measure the form or size of a structure to be formed on the wafer.

Claim 19 (Previously Presented): The apparatus according to claim 15, wherein the optical measuring instrument measures the form or size of a structure on the wafer based on a spectrum of a reflected version of light applied to the wafer.

Claim 20 (Previously Presented): The apparatus according to claim 15, wherein the optical measuring instrument measures the form or size of a structure on the wafer which has completed treatments, and adjusts the etching condition for the etching unit based on such measurements.

Claim 21 (New): An apparatus for processing a wafer comprising:
an optical measuring instrument arranged to conduct a pre-treatment measurement and a post-treatment measurement of each individual wafer in a single batch successively so as to determine a dimension of a structure to be formed on each individual wafer in the single batch;

an etching unit arranged to etch the individual wafer, via a mask pattern, successively to form a structure on the individual wafer in the single batch, using plasma generated under reduced pressure, based on an etching condition;

an ashing unit arranged to remove the mask pattern from the individual wafer after etching successively;

a wetting unit arranged to wet the individual wafer successively so as to remove undesirable corrosive substance produced by etching, including any protective film deposited on a sidewall of the structure on the individual wafer;

a drying unit arranged to dry the individual wafer after wetting successively; and

control means for controlling an order of treatment of the etching unit, the ashing unit, the wetting unit and the drying unit, including transporting the individual wafer from the single batch placed in a wafer cassette through the optical measuring instrument, the etching unit, the wetting unit and the drying unit along the depressurizable transport passage;

wherein, depending upon an order of treatment designated by said control means, the wafer after etching is ashed, via the ashing unit, and then subjected to wetting, via the wetting unit, or, alternatively, the wafer after etching is wetted, via the wetting unit, and then subjected to ashing, via the ashing unit, and afterwards, the structure on the wafer is again measured at the optical measuring instrument for any abnormality such that the etching condition can be optimized for measurement of a next wafer in the single batch placed in the wafer cassette.

Claim 22 (New): The apparatus according to claim 21, wherein the optical measuring instrument measures at a position in a wafer alignment

mechanism set under normal pressure to measure the form or size of a structure to be formed on the individual wafer.

Claim 23 (New): The apparatus according to claim 21, wherein the optical measuring instrument is connected to the etching unit, via the depressurizable transport passage, and the individual wafer is measured by the optical measuring instrument under reduced pressure.

Claim 24 (New): The apparatus according to claim 21, wherein the optical measuring instrument is mounted at a position in a load lock chamber under reduced pressure to measure the form or size of a structure to be formed on the individual wafer, and the optical measuring instrument measures the form or size of a structure on the wafer based on a spectrum of a reflected version of light applied to the individual wafer.

Claim 25 (New): The apparatus according to claim 21, wherein the optical measuring instrument measures the form or size of a structure on the individual wafer which has completed treatments, and adjusts the etching condition for the etching unit based on such measurements.